Megan L. Melamed, Ph.D.

NOAA Chemical Science Laboratory
University of Colorado/CIRES
Boulder, CO, USA
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EDUCATION

University of Colorado, Boulder, CO (2006)
Doctorate of Philosophy in Environmental Engineering
Advisor: Dr. Susan Solomon
Thesis Title: *Aircraft-based ultraviolet spectroscopy measurements of sulfur dioxide emissions from point sources*

University of Colorado, Boulder, CO (2002)
Master of Arts in Environmental Engineering
Advisor: Dr. Susan Solomon
Thesis Title: *Measuring reactive nitrogen emissions from point sources using visible spectroscopy from aircraft*

Colby College, Waterville, ME (2000)
Bachelor of Arts in Chemistry and Spanish, Cum Laude

University of Colorado (2020)
Graduate Certificate in Leadership and Management Engineering Management Program

GRANTS/ AWARDS

National Science Foundation (2018)
International Global Atmospheric Chemistry (IGAC) Project
$360,274

National Aeronautics and Space Administration (2018)
International Global Atmospheric Chemistry (IGAC) Project
$360,274

National Oceanic and Atmospheric Administration (2018)
International Global Atmospheric Chemistry (IGAC) Project
$200,000

National Science Foundation (2017)
Interdisciplinary Biomass Burning Workshop
$15,000

National Aeronautics and Space Administration (2017)
Interdisciplinary Biomass Burning Workshop
$15,000

Department of Energy (2016)
2016 IGAC Science Conference
$48,300

National Aeronautics and Space Administration (2015)
IGBP Landmark Synthesis Event at the 2015 AGU Fall Meeting
$50,175

National Science Foundation (2015)
International Global Atmospheric Chemistry (IGAC) Project
$300,000

National Aeronautics and Space Administration (2015)
International Global Atmospheric Chemistry (IGAC) Project
$300,000

National Oceanic and Atmospheric Administration (2015)
International Global Atmospheric Chemistry (IGAC) Project
$150,000

National Science Foundation (2012)
International Global Atmospheric Chemistry (IGAC) Project
$294,336

National Aeronautics and Space Administration (2012)
International Global Atmospheric Chemistry (IGAC) Project
$294,336

National Oceanic and Atmospheric Administration (2012)
International Global Atmospheric Chemistry (IGAC) Project
$220,583

American Association for the Advancement of Science: Science & Technology Policy Fellowship (2009)

Selected Participant Dissertation Initiative for the Advancement of Climate Change Research Symposium (DISCCRS) IV (2008)

National Science Foundation (2007)
International Research Fellowship Program
Analysis of Mexico City Air Pollution Using Nitrogen and Sulfur Dioxide Column Density Measurements from UV/Visible Spectroscopy
$127,475

Selected Participant Atmospheric Chemistry Colloquium for Emerging Senior Scientist (ACCESS) IX (2007)

RESEARCH EXPERIENCE

Research Scientist III (2020-present)
NOAA Chemical Sciences Laboratory & University of Colorado/CIRES, Boulder, CO, USA
Research Scientist III

- Serves in a scientific advisory role supporting the Director of the NOAA CSL.

Director (2011-2020)
International Global Atmospheric Chemistry (IGAC) Project
Research Scientist III
University of Colorado/CIRES, Boulder, CO, USA (2012-2020)
University of Washington/JISAO, Seattle, WA, USA (2011-2012)

- Served as a leader to the international atmospheric chemistry community by managing an organization with ~1,500 scientists, policy makers, and stakeholders with the mission of facilitating atmospheric chemistry research towards a sustainable world.

- Worked with an international Scientific Steering Committee to determine the goals and priorities of IGAC and then designs strategies to implement and achieve these goals and priorities.
- Initiated new research and networking activities in collaborations with other members of the international atmospheric chemistry community to implement IGAC's vision of connecting fundamental atmospheric chemistry research to global change and sustainability issues.
- Organized, facilitated, and/or led, in collaboration with other scientists, 10-15 IGAC sponsored or endorsed workshops, meetings, and conferences per a year, with a special focus on the biennial IGAC Science Conference, which is considered the international conference on atmospheric chemistry.
- Implemented a significant rebranding and outreach effort to evolve IGAC into a community-focused organization, with much of the new involvement coming from early career scientists and scientists from developing regions of the world.
- Represented IGAC at national and international scientific workshops, meetings, and conferences to emphasize the importance of atmospheric chemistry research to understand some of the most pressing issues of our time such as air quality, climate change, and food and water security.
- Successfully raised and managed grants totaling over $2.6 million since 2012 from U.S. NSF, NASA, NOAA, DOE to run the IGAC International Project Office
- Leveraged the core funding from U.S. NSF, NASA, and NOAA to generate additional $1.2 million in funding from the World Meteorological Organizations (WMO), European Space Agency (ESA), International Union of Geodesy and Geophysics (IUGG), International Association of Meteorology and Atmospheric Sciences (IAMAS), International Artic Science Council (IASC), amongst other organizations to provide travel support to early career and emerging country scientists to attend IGAC sponsored workshops, meetings, and conferences.
- Recognized internationally as an expert in urban air quality, the linkages between air quality and climate change, and science-policy engagement following numerous publications and presentations on these topics.

Science & Technology Policy Fellow (2009-
American Association for the Advancement of Science 2010)
U.S. Environmental Protection Agency, Washington, D.C.

- Served as the atmospheric science expert for the Global Research Program in the National Center for Environmental Research.
- Significantly contributed to an agency Report to Congress on black carbon and short-lived climate forcers and their impacts on air pollution and climate.
- Learned the intricacies of the grant funding process by assisting in the review process of the U.S. EPA Science to Achieve Results (START) grant program.
- Synthesized and analyzed literature on air quality and climate to identify research needs of both the science and policy communities.
- Formulated Request for Applications (RFA) for the Science to Achieve Results (START) Global Change Research Program.

- Engaged international science and policy communities in an initiative to bring transparency and accessibility to air pollution and greenhouse gas emissions.
- Investigated and summarized how global climate and regional chemistry models are used to study interactions between air quality and climate change.
- Briefed the Under Secretary of State for Diplomacy and Global Affairs on climate change in the Arctic prior to a meeting of the Arctic Council Members.

NSF International Research Fellow (2007-2009)
Universidad National Autónoma de México, Mexico City, Mexico

- Analyzed ground-based UV/visible zenith sky spectra taken during the Megacity Initiative: Local and Global Research Observations (MILAGRO) 2006 using the Differential Optical Absorption Spectroscopy (DOAS) method to retrieve differential slant column densities of nitrogen dioxide (NO_2) from the Tenango del Aire and Altzomoni research sites.
- Integrated the NO_2 differential slant column density data set with ceilometer mixing layer height data and in situ NO_2 data.
- Used the integrated data set to study pollution transport events to the southeast of Mexico City and to study the development of the mixing layer throughout the day. This information is critical to understand pollution transport during the MILAGRO 2006 campaign as the Tenango del Aire research site was the only site located to the south of the city.
- Installed permanent DOAS instrument to continuously measure NO_2 and sulfur dioxide (SO_2) in Mexico City. The continuous measurements provide unique information on the development of the missing layer in Mexico City as well as identify when SO_2 emissions from Popocatepetl volcano may be influencing air pollution within Mexico City.
- Mentored graduate students about the DOAS method and its use in urban air pollution studies.

Research Scientist I (2007)
University of Colorado/CIRES, Boulder, CO
National Oceanic and Atmospheric Administration, Boulder, CO

- Developed a new method to use oxygen dimer (O_4) slant column density measurements to calculate the photon path length, or air mass factor (AMF), for pollutants such as SO_2, residing in the planetary boundary layer.
- Used the new AMF method in conjunction with SO_2 slant column density measurement from aircraft to calculate SO_2 emission fluxes from power plants in the Ohio River Valley as part of the International Consortium for Atmospheric Research on Transport and Transformation (ICARTT) 2014 field campaign.

Graduate Research Assistant (2000-2006)
University of Colorado/CIRES, Boulder, CO
National Oceanic and Atmospheric Administration, Boulder, CO

- Analyzed visible spectra taken aboard an aircraft during the Texas Air Quality Study (TexAQS) 2000 to retrieve NO_2 differential slant column densities.
- Assisted in the development and deployment of an ultraviolet spectrometer optimized to measure SO_2 from a NOAA WP-3D aircraft for the New England Air Quality Study (NEAQS) 2004.
- Participated in NEAQS, which was part of the ICARTT 2004 field campaign, which involved pre-flight instrument calibration, monitoring of instrumentation during flights, post-flight instrument maintenance, and data collection.
- Developed an IDL-based data analysis program to analyze ultraviolet spectra using the DOAS method to retrieve SO_2 and O_4 differential slant column densities.
- Measured the AMF for SO_2 slant column densities from aircraft using the information given by O_4 slant column densities.
- Used SO_2 and O_4 slant column densities measured from aircraft to calculate the SO_2 emission fluxes from power plants in the Ohio River Valley.

SUBMITTED/IN PREPERATION ARTICLES

von Schneidemesser, E., **Melamed, M. L.**, and Schmale, J., and Seddon, J.: Prepare Scientists to Engage in the Science-Policy System, In Preparation.

PEER REVIEWED PUBLICATIONS

Thomas, J.L., Stutz, J., Frey, M.M., Bartels-Rausch, T., Altieri, K., Baladima, F., Browse, J., Dall'Osto, M., Marelle, L., Mouginot, J., Murphy, J.G., Nomura, D., Pratt, K.A., Willis, M.D., Zieger, P., Abbatt, J., Douglas, T.A., Facchini, M.C., France, J., Jones, A.E., Kim, K., Matrai, P.A., McNeill, V.F., Saiz-Lopez, A., Shepson, P., Steiner, N., Law, K.S., Arnold, S.R., Delille, B., Schmale, J., Sonke, J.E., Dommergue, A., Voisin, D., **Melamed, M.L**. and Gier, J., Fostering multidisciplinary research on interactions between chemistry, biology, and physics within the coupled cryosphere-atmosphere system. *Elem Sci Anth*, 7(1), p.58. doi: 10.1525/elementa.396, 2019.

Burkholder, J., Abbatt, J., Barnes, I., Roberts, J., **Melamed, M. L.**, Ammann, M., Bertram, A., Cappa, C., Carlton, A., Carpenter, L. J., Crowley, J., Dubowski, Y., George, C., Heard, D. E., Hermann, H., Keutsch, F., Kroll, J., McNiell, V. F., Ng, N. L., Nizkorodov, S., Oralndo, J. J., Percival, C., Picquett-Varrault, B., Rudich, Y., Seakins, P., Surratt, J., Tanimoto, H., Thorton, J., Zhu, T., Tyndall, G., Wahner, A., Weschler, C. J., Wilson, K. and Ziemann, P.: The Essential Role for Laboratory Studies in Atmospheric Chemistry, Environ. Sci. Technol., 2017.

Melamed, M. L., Schmale, J. and von Schneidemesser, E.: Sustainable Policy - Key considerations for air quality and climate change, Curr. Opin. Environ. Sustain., doi: 10.1016/j.cosust.2016.12.003, 2016.

Andrade-Flores, M., Rojas, N., **Melamed, M. L.**, Mayol-Bracero, O. L., Grutter, M., Dawidowski, L., Antuña-Marrero, J. C., Rudamas, C., Gallardo, L., Mamani-Paco, R., Andrade, M. de F. and Huneeus, N.: Fostering a collaborative atmospheric chemistry research community in the Latin America and Caribbean Region, Bull. Am. Meteorol. Soc., doi:10.1175/BAMS-D-14-00267.1, 2016.

Arnold, S. R., Law, K. S., Brock, C. A., Thomas, J. L., Starkweather, S. M., Salzen, K. von, Stohl, A., Sharma, S., Lund, M. T., Flanner, M. G., Petäjä, T., Tanimoto, H., Gamble, J., Dibb, J. E., **Melamed, M.L.**, Johnson, N., Fidel, M., Tynkkynen, V.-P., Baklanov, A., Eckhardt, S., Monks, S. A., Browse, J. and Bozem, H.: Arctic air

pollution: Challenges and opportunities for the next decade, Elem. Sci. Anthr., 4(1), 000104, doi:10.12952/journal.elementa.000104, 2016.

Melamed, M. L., Monks, P. S., Goldstein, A. H., Lawrence, M. G. and Jennings, J.: The international global atmospheric chemistry (IGAC) project: Facilitating atmospheric chemistry research for 25 years, Anthropocene, 12, 17–28, doi:10.1016/j.ancene.2015.10.001, 2015.

Monks, P. S., **Melamed, M.** and Seitzinger, S.: The IGBP Synthesis: Celebrating three decades of Earth system science, Anthropocene, 12, 1–2, doi:10.1016/j.ancene.2016.03.001, 2015.

Abbatt, J., George, C., **Melamed, M.L.**, Monks, P., Pandis, S. and Rudich, Y.: New Directions: Fundamentals of atmospheric chemistry: Keeping a three-legged stool balanced, Atmos. Environ., 84, 390–391, doi:10.1016/j.atmosenv.2013.10.025, 2014.

Frost, G. J., Falke, S. R., Granier, C., Keating, T., Lamarque, J.-F., **Melamed, M. L.**, Middleton, P., Pétron, G. and Smith, S. J.: New Directions: Toward a community emissions approach, Atmos. Environ., 51, 333–334, doi:10.1016/j.atmosenv.2012.01.055, 2012.

Melamed, M. L., Basaldud, R., Steinbrecher, R., Emeis, S., Ruíz-Suárez, L. G. and Grutter, M.: Detection of pollution transport events southeast of Mexico City using ground-based visible spectroscopy measurements of nitrogen dioxide, Atmos Chem Phys, 9(14), 4827–4840, doi:10.5194/acp-9-4827-2009, 2009.

Melamed, M. L., Langford, A. O., Daniel, J. S., Portmann, R. W., Miller, H. L., Eubank, C. S., Schofield, R., Holloway, J. and Solomon, S.: Sulfur dioxide emission flux measurements from point sources using airborne near ultraviolet spectroscopy during the New England Air Quality Study 2004, J. Geophys. Res. Atmospheres, 113(D2), D02305, doi:10.1029/2007JD008923, 2008.

Schofield, R., Daniel, J. S., Portmann, R. W., Miller, H. L., Solomon, S., Eubank, C. S., **Melamed, M. L.**, Langford, A. O., Shupe, M. D. and Turner, D. D.: Retrieval of effective radius and liquid water path from ground-based instruments: A case study at Barrow, Alaska, J. Geophys. Res. Atmospheres, 112(D21), D21203, doi:10.1029/2007JD008737, 2007.

Langford, A. O., Schofield, R., Daniel, J. S., Portmann, R. W., **Melamed, M. L.**, Miller, H. L., Dutton, E. G. and Solomon, S.: On the variability of the Ring effect in the near ultraviolet: understanding the role of aerosols and multiple scattering, Atmos Chem Phys, 7(3), 575–586, doi:10.5194/acp-7-575-2007, 2007.

King, D. W., Cooper, W. J., Rusak, S. A., Peake, B. M., Kiddle, J. J., O'Sullivan, D. W., **Melamed, M. L.,** Morgan, C. R. and Theberge, S. M.: Flow injection analysis of H2O2 in natural waters using acridinium ester chemiluminescence: method development and optimization using a kinetic model, Anal. Chem., 79(11), 4169–4176, doi:10.1021/ac062228w, 2007.

Melamed, M. L., Solomon, S., Daniel, J. S., Langford, A. O., Portmann, R. W., Ryerson, T. B., D. K. Nicks, J. and McKeen, S. A.: Measuring reactive nitrogen emissions from point sources using visible spectroscopy from aircraft, J. Environ. Monit., 5(1), 29–34, doi:10.1039/B204220G, 2003.

Poon, T., C.F. Eller, L.R Eller, K.M. Jones, W. Massello, C.M. Norris, J.A. Oelrich, T.A. Pluim, J.P. McIntyre, A.E. Dorigo, M.A. Davis, H.K. Izumi, K.H. Kelley, **M.L. Melamed**, S.E. Poplawski, J.M. St. Clair, M.P. Stokes, W.C. Wheeler, and E.E. Wilkes.: The preparation of a UV-light-absorbing polymer: A project-oriented laboratory experiment for the introductory organic chemistry curriculum, J. Chem. Edu., 76(11), 1523, doi: 10.1021/ed076p1523, 1999.

OTHER PUBLICATIONS

IGACnews, **Melamed, M.L. (ed).** Issues 44-66, 2011-2020.

World Climate Research Programme (2019). Global Research and Action Agenda on Cities and Climate Change Science - Full Version. Prieur-Richard, A.H., B. Walsh, M. Craig, **M.L. Melamed**, M. Colbert, M. Pathak, S. Connors, X. Bai, A. Barau, H. Bulkeley, H. Cleugh, M. Cohen, S. Colenbrander, D. Dodman, S. Dhakal, R. Dawson, J. Espey, J. Greenwalt, P. Kurian, B. Lee, L. Leonardsen, V. Masson-Delmotte, D. Munshi, A. Okem, G.C. Delgado Ramos, R. Sanchez Rodriguez, D. Roberts, C. Rosenzweig, S. Schultz, K. Seto, W. Solecki, M. van Staden, and D. Ürge-Vorsatz (Eds.). 31 pp. WCRP Publication No. 13/2019. Available at: https://www. wcrp-climate.org/WCRP-publications/2019/GRAA-Cities-and-Climate-Change-Science-Full.pdf.

Baumgardner, D., M. de Fatima Andrade, Z. Kilmont, J. Kuylenstierna, S.M., Carvalho, N. Borgford-Parnell, O.L. Mayol-Braceros, **M.L. Melamed**, R. Seguel, M. Andrade, C. Rudamas, G. Ruiz-Suaréz, O. Anchez-Ccoyllo, J. Ometto, M. Cazorla, L. Höglund Isaksson, P. Purohit, O.M. Cerutti, P. Medina, N. Hunueeus, J.A. Ortinez, L. Dawidowski, D. Henze, and N. Rojas, Short-lived climate pollutants: Drivers, regional emissions and measurements in *Integrated Assessment of Short-lived Climate Pollutants in Latin America and the Caribbean: Improving air quality while contributing to climate change mitigation*, 18-53, edited by Raga, G. and P. Artaxo, United Nations Environment Programme (UNEP) and Climate and Clean Air Coalition (CCAC), ISBN: 978-92-807-3549-9, 2018.

Zhu, T., **Melamed, M. L.**, Parrish, D., Gllardo Klenner, L., Lawrence, M., Konare, A. and Liousse, C.: WMO/IGAC Impacts of Megacities on Air Pollution and Climate, World Meteorological Organization, Geneva, Switzerland, 2012.

IGBP/IGAC: Time to Act: The Opportunity to Simultaneously Mitigate Air Pollution and Climate Change, International Geosphere-Biosphere Programme (IGBP) and International Global Atmospheric Chemistry (IGAC) Project, 2012.

RESEARCH TALKS

The International Global Atmospheric Chemistry (IGAC) Project (2011-Present)
Numerous locations around the world

Insights after 8 years as the IGAC Executive Officer (2019)
University of York, UK

Air Quality: What it is, why we care, and what are the main issues (2018)
World Resources Institute Retreat, San Francisco, CA, USA

The Impacts of Megacities on Air Quality and Climate Change
University of Colorado, Boulder, CO, USA (2013)
Colorado State University, Ft. Collins, CO, USA (2013)

Air Pollution & Climate Change (2012)
UNEP-ABC Meeting, Beijing, China

	Atmospheric Chemistry in Megacities *Washington State University, Pullman, WA, USA*	(2011)
	A more comprehensive view of air pollution in the Mexico City basin using ground-based visible spectroscopy measurements of NO_2	
	University of Washington, Seattle, WA, USA	(2011)
	Universidad Nacional Autónoma de México, Mexico City, Mexico	(2009)
	Harvard University, Cambridge, MA, USA	(2009)
	El Cambio Climático: Qué Sgnifica para la Contaminación del Aire *CENICA, Mexico City, Mexico*	(2009)
	Looking Beyond the Surface: How spectroscopy measurements can provide a more comprehensive view of air pollution *DISCCRS, Mesa, AZ, USA*	(2008)
	Aircarft-based ultraviolet spectroscopy measurement of sulfur dioxide emissions from point sources *Universidad Nacional Autónoma de México, Mexico City, Mexico*	(2007)
	The differential optical absorption spectroscopy (DOAS) method: An overview and its application in urban air pollution studies *ACCESS, Yellowstone, MT, USA*	(2007)
TEACHING TALKS	La Calidad del Aire en el Contexto de Cambio Climatico *CATHALAC, United Nations University, Panama*	(2015-2019)
	What is an atmospheric chemist, what do we study, and why are international collaborations important. *Takamatsu High School, Takamatsu, Kagawa, Japan*	(2018)
	Air Pollution in the Context on Global Change *University of Northern Colorado, Greeley, CO, USA*	(2014)
	How I became an atmospheric scientist *University of Colorado, Denver, CO*	(2013)
	Life as a Scientist *Denver Green School, Denver, CO, USA*	(2012-2013)
	How I became an atmospheric scientist *Seattle Community College, Seattle, WA, USA*	(2011)
	Green Energy: What's that? Why should I care? *Sacred Heart School, Washington, DC*	(2010)
	Life as a Scientist *Lafayette Elementary, Lafayette, CO, USA*	(2005-2011)
PUBLIC TALKS	How did growing up in Nederland lead to directing an international organization on Atmospheric Chemistry? *Nederland Library, Nederland, CO, USA*	(2016)
	An Overview of Air Pollution in the Mexico City Metropolitan Area *Casa de la Universidad de California, Mexico City, Mexico*	(2009)

SYNERGISTIC ACTIVITIES

Reviewer for early career and graduate fellowships, training courses, etc.
Peer Reviewer for international scientific journals and grant programs
Member American Association for the Advancement of Science
Member American Geophysical Union
Steering Committee Member for international scientific conferences
Participant AAAS Dialogue on Science, Ethics, and Religion (Video)
Volunteer Boulder County Mountain Sustainability Committee
Member & Volunteer Earth Science Women's Network
Participant Future Stewards Leadership and Facilitation Training

LANGUAGES

English: Fluent (native language)
Spanish: Fluent